



# GSDO

GROUND SYSTEMS  
DEVELOPMENT & OPERATIONS

EXPLORATION BEGINS HERE



## PROGRAM HIGHLIGHTS • SEPTEMBER 2015

At NASA's Kennedy Space Center in Florida, the Ground Systems Development and Operations (GSDO) Program Office is leading the center's transformation from a historically government-only launch complex to a spaceport bustling with activity involving government and commercial vehicles alike. GSDO is tasked with developing and using the complex equipment required to safely handle a variety of rockets and spacecraft during assembly, transport and launch. For more information about GSDO accomplishments happening around the center, visit <http://go.nasa.gov/groundsystems>.

## Umbilical Testing Underway with Simulated Rocket Launch

When NASA's powerful rocket, the Space Launch System (SLS), is prepared for launch, it will be rolled out to the launch pad aboard a mobile launcher. The launcher will be equipped with a number of lines, called umbilicals, which connect to the rocket and Orion spacecraft to provide power, communications, coolant and fuel. In preparation for the rocket's first launch on Exploration Mission-1 (EM-1), engineers are conducting a series of tests on the umbilical system, including a simulated rocket launch.

The tower on the mobile launcher contains several of these umbilicals, the first of which to be tested is the Orion service module umbilical (OSMU). This umbilical will be located high on the tower and will transfer liquid coolant for the electronics and air for the Environmental Control System (ECS) prior to launch to the Orion service module that houses critical systems that support the spacecraft.

The Ground Systems Development and Operations (GSDO) Program is coordinating and overseeing the tests at the Launch Equipment Test Facility (LETF) at Kennedy Space Center. The LETF will verify the 15-foot umbilical is functioning properly before it is installed on the mobile launcher early next year. During testing, engineers will supply water for the electronics and nitrogen to simulate the ECS.

"This is the second umbilical in a series of tests that we'll be performing for GSDO," said Martin Grashik, mechanical systems test engineer. "It is the first umbilical for the tower and is more technically complex, and more challenging to test, than anything we've done for GSDO so far."

During the first in the series of tests for this umbilical, the OSMU will be attached to a Vehicle Motion Simulator that can simulate all expected launch vehicle motions from rollout through about the first half-second of launch, when the umbilical is disconnected.



A view from above shows the Orion Service Module Umbilical (OSMU) in the foreground at the Launch Equipment Test Facility. Behind it, a heavy-lift crane is attached to the Interim Cryogenic Propulsion Stage Umbilical (ICPSU). The ICPSU will be lifted and installed on the A Tower mobile launcher simulator for testing after OSMU testing has been completed. Photo credit: NASA/Glen Benson

The team also will check the OSMU umbilical interfaces for functionality. They will confirm the mechanisms that raise and lower the umbilical are working.

Then, the OSMU will be put through the paces of a simulated rocket launch. Engineers will attach the umbilical to a replicated section of the Orion Service Module on the simulator, and the OSMU will experience the maximum velocity, up to 120 inches per second, during the launch simulation.

To read the complete story, visit <http://go.nasa.gov/1WnJR3L>.

# Ground Systems Team Spotlight

**Shiu Yue**, known to his friends as Mike, is a senior technical specialist mechanical engineer with Vencore on the Engineering Services Contract at Kennedy Space Center. His main responsibilities include serving as the test conductor for the Orion service module umbilical and maintaining and operating the Vehicle Motion Simulator at the Launch Equipment Test Facility (LETf).



"I am part of the LETf team that tests the ground support equipment required to support Ground Systems Development and Operations objectives," Yue said.

His career at the center began in November 1989 as a handling and mechanical engineer with McDonnell Douglas on the Spacelab program. He moved on to the Space Station Program to work with payload handling, ground support equipment and the Meteorology/Alignment group. In 2001, he joined the Delta II

Program at Cape Canaveral Air Force Station and worked on numerous GPS missions, Mars Landers A and B, and the Pluto New Horizons mission. He was instrumental in developing the LETf at Kennedy.

"The coolest part of my job is seeing the end results of all the hard work by designers, fabricators and programmers and how it all comes together at the LETf to support GSDO and the tests," Yue said.

He is most proud of his contributions to the development of the Vehicle Motion Simulators and test site development to prepare the LETf to support GSDO testing.

Yue was born in Hong Kong, and came to the U.S. in 1972. He earned a bachelor's degree in mechanical engineering from the University of Florida, and a master's degree in computer information systems from the University of Phoenix.

"Growing up in my family, science and mathematics is like the flu vaccine; it is going in with or without tears," Yue said. "What nerdy kid doesn't like space, the final frontier?"

Yue's first car was a 1976 screaming yellow Chevy Nova that averaged 8 mpg of gasoline.

Yue and his wife, Becky, are celebrating their 20th anniversary. His hobbies include motorcycles, running, cooking and reading books.

**Mike Parrish** is an operations chief and project manager with Jacobs Technology on the Test Operations and Support Contract at NASA's Kennedy Space Center. He has worked at the center since 1979.

He began his career as an electrical technician working on space shuttle Columbia. He was the operations chief for space shuttle Endeavour during the final 11 years of the Space Shuttle Program. As the shuttle program ended, he worked as the project manager supporting crawler-transporter upgrades

required for NASA's Space Launch System (SLS), and had the opportunity to be part of the astronaut exchange crew for the final mission of Atlantis.

With Jacobs Technology, Parrish is supporting GSDO by planning for the arrival of the SLS rocket for Exploration Mission-1. He and his co-workers are developing the concept of operations required to process the Orion capsule and service module at the Multi-Payload Processing Facility (MPPF). They also will perform fueling operations at the MPPF for the Orion capsule and service module (CSM). The other significant operation performed in the MPPF will be fueling of the Interim Cryogenic Propulsion Stage (ICPS).

"I wear two hats to support GSDO," Parrish said. "As we transitioned out of the shuttle program, I became the project manager on the crawler for the first two years of crawler upgrades. Two major projects I am currently tracking are the dedicated crane crew that is supporting platform installation in High Bay 3 of the Vehicle Assembly Building (VAB) and the Doppler wind profiler that will provide weather information for the Eastern Range, and specifically for the SLS."

The second hat he wears is operations, focusing on the MPPF and Launch Abort Servicing Facility flow that will service and prepare Orion for flight and deservice the spacecraft after landing.

Parrish loves the challenge of learning something new and seeing the different areas of Kennedy starting to evolve into the spaceport of the future and knowing he has a small part in making that happen.

The crawler upgrades are the biggest achievement just in sheer mass, and installing the very first platform in High Bay 3 to support SLS is something Parrish said his team is very proud of.

Parrish first became fascinated with space during the Apollo program. "I can still remember where I was when Neil Armstrong stepped onto the moon. The rest is history and we got to be part of it," Parrish said. "My hopes for the future are that our dreams stay big and our worries stay small."

Parrish grew up in a little town called Geneseo in Illinois. His first vehicle was a 1964 international orange pickup truck that always started on cold Illinois winter days.

He and wife Deb have two children, a son, Chris, 36, and daughter, Anna, 26. They also have two grandchildren, with a third due in April.

They have a Maltese dog named Astro (short for astronaut), who loves to ride on their boat, paddle board, personal watercraft and kayak. Parrish's hobbies include waterskiing, snow skiing and scuba diving. He would like to try skydiving one day.



# Industry Spotlight: Hensel Phelps

Hensel Phelps was founded in Greeley, Colorado, in 1937 by Abel Hensel Phelps. The company currently has eight district offices located throughout the country, with its corporate headquarters in Greeley and a southeast district office in Orlando, Florida. The company specializes in planning, design, construction and management of facilities.

Hensel Phelps has a long history of working on projects with Kennedy Space Center. In 1998, the company was awarded its first project, the Evolved Expendable Launch Vehicle. This multimillion dollar, design and build project resulted in additional projects at Kennedy and Cape Canaveral Air Force Station. For the past 17 years, Hensel Phelps has focused its efforts on procuring and delivering successful projects for public and private aerospace companies.

“NASA is a very important client for Hensel Phelps, and being a partner on new and challenging projects is always exciting and a privilege,” said Courtland Creech, project manager. “NASA has the vision for the space program and a very talented group of individuals who can achieve those goals.”

The company currently is ranked No.10 Design-Build Contractor and No. 23 Contractor by Volume in the U.S., according to the Engineering News Record.

One of Hensel’s projects that supports the Ground Systems Development and Operations Program at Kennedy is the modification of High Bay 3 in the Vehicle Assembly Building to accommodate NASA’s Space Launch System rocket and Orion spacecraft. The company is constructing and will install 10 levels of fully deployable work platforms in High Bay 3. The platforms are being designed to move up and down and will contain an insert that can be removed to accommodate different vehicle configurations.

Hensel also is working on additional building reinforcement, fire suppression, and electrical and mechanical systems that will be needed to support the functionality and safety of each platform in the high bay.

“Hensel Phelps is a supporter of NASA’s space program and hopes that the services we provide on the various projects that we are currently a part of at Kennedy allow NASA and its partners to achieve those goals,” Creech said.



The first half of the J level platforms for High Bay 3 in the Vehicle Assembly Building arrived Sept. 15 at NASA’s Kennedy Space Center. Photo credit: NASA



A flatbed truck, carrying the second half of the J level work platforms for the Vehicle Assembly Building (VAB), arrives Oct. 2 at the VAB at NASA’s Kennedy Space Center. The platform was transported from Sauer Co. in Oak Hill, Florida. Also in view in the staging area are the two K level work platforms that were delivered to Kennedy earlier this year. GSDO is overseeing upgrades and modifications to High Bay 3 in the VAB to support processing of NASA’s Space Launch System (SLS) and Orion spacecraft. A total of 10 levels of new platforms, 20 platforms altogether, will surround the SLS rocket and Orion spacecraft and provide access for testing and processing in High Bay 3. Photo credit: Ben Smegelsky

# Employee Spotlight: Mike Miller

Mike Miller is an element project and technical manager for the Ground Systems Development and Operations Program at NASA's Kennedy Space Center. His primary responsibility is project management of ground systems and equipment design, construction, and verification and validation in addition to development and management of technical requirements.

"The coolest part of my job is being able to participate in the construction phases of our projects. It's when all the planning and development becomes real," Miller said.

During his time in GSDO, Miller says he has been blessed to work on many interesting projects. He's enjoyed working at the Launch Equipment Test Facility, Launch Pad 39B, and the Rotation, Processing and Surge Facility in the development of new systems and equipment.

Miller decided to work for GSDO when an opportunity opened up to work in field and construction management.

"It was very interesting to me," Miller said. "After I met a few people in the



organization, I knew it was going to be a good fit. The people I work with are second to none."

He first became interested in space when his father took him to Lindbergh Field in San Diego to watch planes take off and land. He became fascinated with anything and everything that flew.

Miller's hometown is La Mesa, California. He earned a Bachelor of Science in aerospace engineering from San Diego State University.

His first car was a white 1966 Volkswagon Beetle.

Miller and his wife, Maria, have been married for 24 years. They have two daughters, Alyssa, 16, and Amanda, 11. His hobbies include history and early American coinage.



In the transfer aisle of the Vehicle Assembly Building at NASA's Kennedy Space Center in Florida, workers monitor the progress as a crane lowers the Orion crew module transportation cover away from the crew and service module (CSM) pathfinder during an installation demonstration Aug. 27 using the CSM pathfinder and the Exploration Flight Test-1 CSM transportation cover. Use of the pathfinder will allow GSDO to evaluate the cover installation and removal operation and interface with the CSM in order to provide any improvements for the final cover design. The demonstration also will allow GSDO to evaluate the necessary procedures for future Orion operations in the Multi-Payload Processing Facility and the Launch Abort System Facility, crane height, and provide workers with handling and operational experience. Orion will next launch atop NASA's Space Launch System rocket on Exploration Mission-1. Photo credit: NASA/Kim Shiflett